steel, one first covers an iron test spoon with a thin crust of slag by means of turning it over in the slag, which will shield the metal of the spoon from direct contact with the molten metal of the bath, and one thereupon takes a sample of the same from the furnace and observes its behaviour during pouring out. The metal should be completely fluid and admit of being quite slowly poured out, without leaving a film behind in the spoon. One often accelerates the test by means of removing the slag layer, which covers the metal in the spoon and thereby gives it the capability of rapidly radiating heat to the surroundings. If the metal is or becomes viscous or leaves behind it a film in the spoon, it is too cold, and must at once be heated up. The safest means for this purpose is to set up anew a boil, whereby the heat action of the furnace is transferred to the bath in the most powerful manner. This, however, can only happen if the metal still contains enough carbon, and therefore it must, equally as a hot bath before tapping, be now tested also as to its composition.

JUDGING THE DEGREE OF HARDNESS OF THE METAL.

The more reducing agents an iron contains, the more brittle it is in general, and the more easily an article made therefrom is broken. This property of iron furnishes the possibility of rapidly arriving at some conclusion as to the composition of the metal, in the entire process of making ingot-iron or steel.

The peculiarities in the elimination of the reducing agents are accompanied by the fact that most usually only carbon and phosphorus are found in the steel in amounts which exceed the admissible normal.

The investigation of the composition of the metal can bo carried out by two-fold methods, by either employing a cast test ingot or forging out the material previous to testing.

The first mode of test requires very little time. About 1 kilogramme steel is poured with the test spoon into a trough-shaped mould, or in a mould of rectangular section (which is made by placing two right-angled elbow-pieces of steel on an iron foundation) and immediately after solidification of the test it is slaked off. Metal with a carbon content of about